

MRF10005



Microwave Power Silicon Bipolar Transistor
5.0 W, 960–1215 MHz, 28V

M/A-COM Products
 Released - Rev. 053007

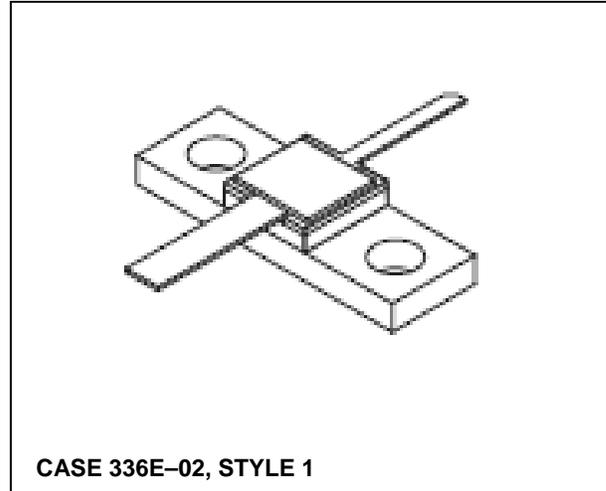
Features

- Guaranteed performance @1.215GHz, 28Vdc
- Output power: 5.0W CW
- Minimum gain = 8.5dB, 10.3dB (Typ.)
- RF performance curves for 28 Vdc and 36 Vdc operation
- 100% tested for load mismatch at all phase angles with 10:1 VSWR
- Hermetically sealed industry standard package
- Silicon nitride passivated
- Gold metallized, emitter ballasted for long life and resistance to metal migration
- Internal input matching for broadband operation

Description and Applications

Designed for CW and long-pulsed common base amplifier applications, such as JTIDS and Mode S, in the 0.96 to 1.215 GHz frequency range with high overall duty cycles.

Product Image



Maximum Ratings

	Symbol	Value	Unit
Collector–Emitter Voltage	V_{CES}	55	Vdc
Collector–Base Voltage	V_{CBO}	55	Vdc
Emitter–Base Voltage	V_{EBO}	3.5	Vdc
Collector Current — Continuous (1)	I_C	1.25	mAdc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ (1) Derate above 25°C	P_D	25 143	Watt mW/ $^\circ\text{C}$
Storage Temperature Range	T_{stg}	-65 to +200	$^\circ\text{C}$
Junction Temperature	T_J	200	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case (2)	$R_{\theta JC}$	7.0	$^\circ\text{C/W}$

NOTES:

1. These devices are designed for RF operation. The total device dissipation rating applies only when the devices are operated as RF amplifiers.
2. Thermal Resistance is determined under specified RF operating conditions by infrared measurement techniques.

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ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$ unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage ($I_C = 25\text{ mAdc}$, $V_{BE} = 0$)	$V_{(BR)CES}$	55	—	—	Vdc
Collector–Base Breakdown Voltage ($I_C = 25\text{ mAdc}$, $I_E = 0$)	$V_{(BR)CBO}$	55	—	—	Vdc
Emitter–Base Breakdown Voltage ($I_E = 0.5\text{ mAdc}$, $I_C = 0$)	$V_{(BR)EBO}$	3.5	—	—	Vdc
Collector Cutoff Current ($V_{CB} = 28\text{ Vdc}$, $I_E = 0$)	I_{CBO}	—	—	1.0	mAdc

ON CHARACTERISTICS

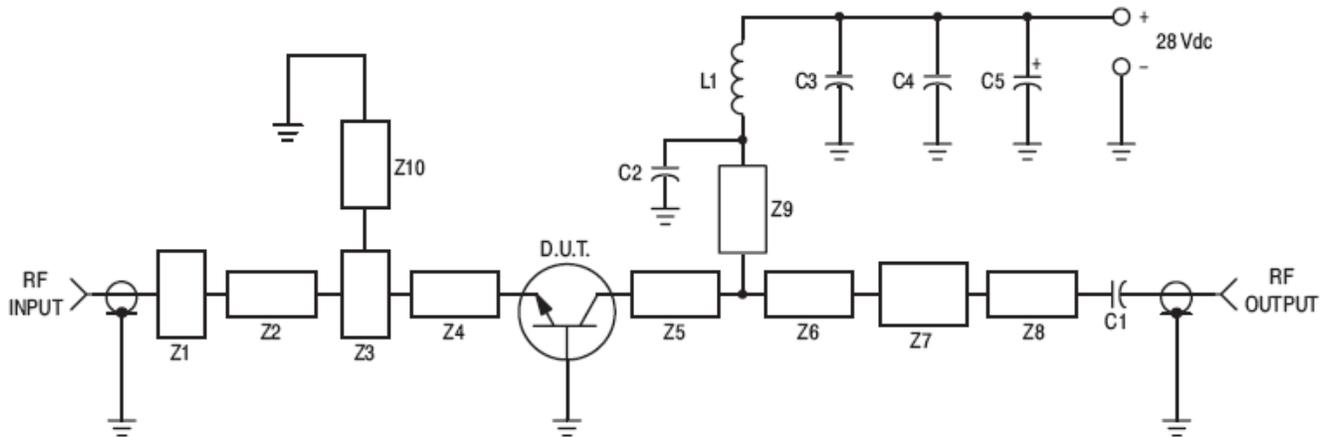
DC Current Gain ($I_C = 500\text{ mAdc}$, $V_{CE} = 5.0\text{ Vdc}$)	h_{FE}	20	—	100	—
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DYNAMIC CHARACTERISTICS

Output Capacitance ($V_{CB} = 28\text{ Vdc}$, $I_E = 0$, $f = 1.0\text{ MHz}$)	C_{ob}	—	7.0	10	pF
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FUNCTIONAL TESTS

Common–Base Amplifier Power Gain ($V_{CC} = 28\text{ Vdc}$, $P_{out} = 5.0\text{ W}$, $f = 1215\text{ MHz}$)	G_{PB}	8.5	10.3	—	dB
Collector Efficiency ($V_{CC} = 28\text{ Vdc}$, $P_{out} = 5.0\text{ W}$, $f = 1215\text{ MHz}$)	η	45	55	—	%
Load Mismatch ($V_{CC} = 28\text{ Vdc}$, $P_{out} = 5.0\text{ W}$, $f = 1215\text{ MHz}$, VSWR = 10:1 All Phase Angles)	ψ	No Degradation in Output Power			



C1, C2, C3 — 220 pF 100 mil Chip Capacitor
 C4 — 0.1 μF
 C5 — 47 $\mu\text{F}/50\text{ V}$ Electrolytic
 L1 — 3 turn #18 AWG, 1/8" ID, 0.18" Long

Z1–Z10 — Microstrip, see details below
 Board Material — 0.030" Glass Teflon,
 2.0 oz. Copper, $\epsilon_r = 2.55$

ADVANCED: Data Sheets contain information regarding a product M/A-COM Technology Solutions is considering for development. Performance is based on target specifications, simulated results, and/or prototype measurements. Commitment to develop is not guaranteed.
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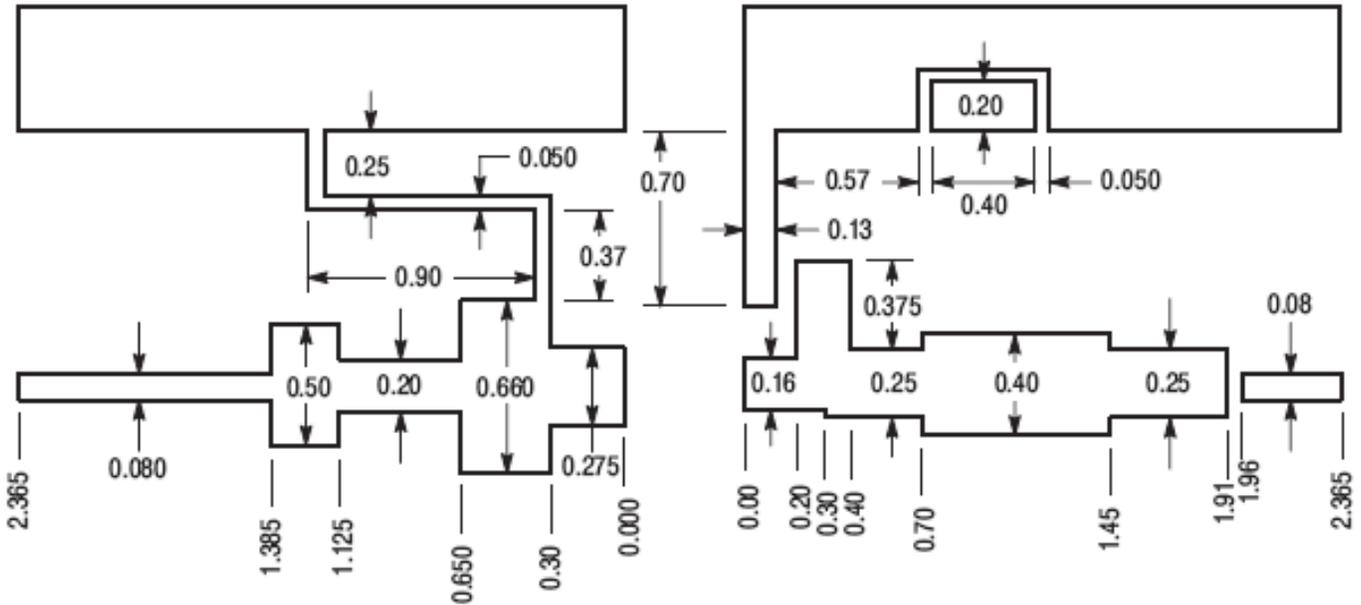


Figure 1. Test Circuit

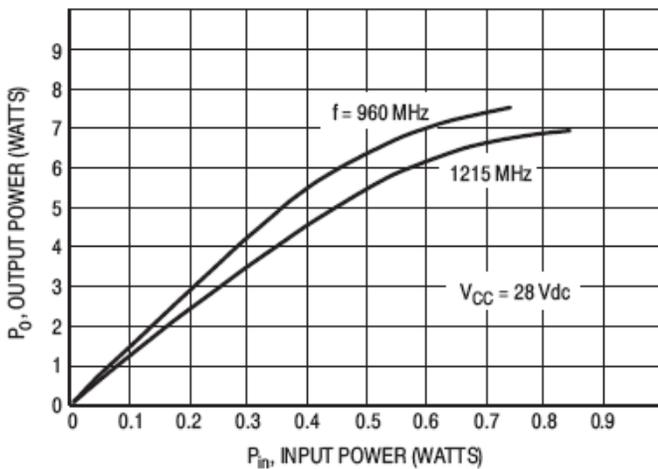


Figure 2. Output Power versus Input Power

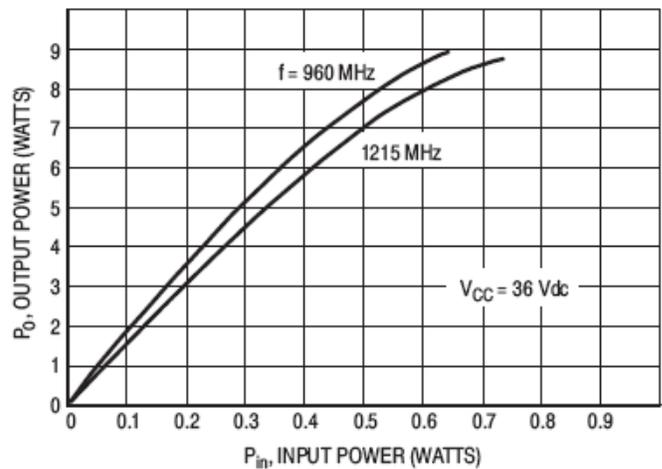
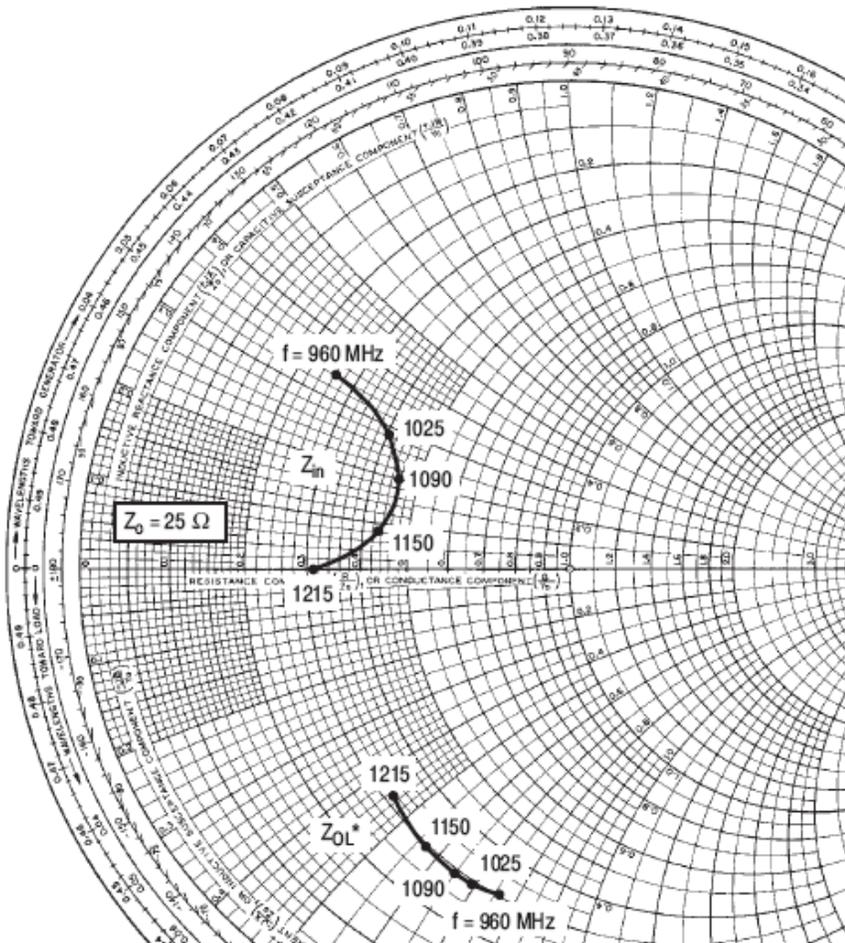


Figure 3. Output Power versus Input Power



$P_{out} = 5\text{ W}, V_{CC} = 28\text{ V}$

f MHz	Z_{in} OHMS	Z_{OL}^* OHMS
960	$6.5 + j8.5$	$7.4 - j18.9$
1025	$10.0 + j7.0$	$7.2 - j17.4$
1090	$11.2 + j4.9$	$7.1 - j16.3$
1150	$10.8 + j2.0$	$7.15 - j14.3$
1215	$7.8 + j0.0$	$7.8 - j11.2$

Z_{OL}^* = Conjugate of the optimum load impedance into which the device output operates at a given output power, voltage and frequency.

Figure 4. Series Equivalent Input/Output Impedances

PACKAGE DIMENSIONS

